# RTCA Special Committee 186, Working Group 5

# ADS-B UAT MOPS

# Meeting #6

## UAT Performance in the Presence of JTIDS Interference: Sensitivity to Receiver Bandwidth

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SUMMARY

In response to Action Item 5-10, some additional information on the susceptibility of UAT to JTIDS interference is provided. The difference in UAT performance with different IF filters is the focus of this inquiry. It is recommended that WG-5 consider this information in its deliberations on IF filter choice.

This paper addresses the difference in UAT performance in the presence of JTIDS interference depending on which of the two IF filters currently under consideration is used. The two filters are described in UAT-WP-5-08, and are referred to in this paper as "narrow" (i.e., nominal 3 dB bandwidth of 800 kHz) and "wide" (i.e., nominal 3 dB bandwidth of 1.26 MHz). Two JTIDS scenarios are considered: a "heavy" scenario designated 2A* in UAT-WP-5-07 and a "light" scenario designated 3 in UAT-WP-5-07. The UAT performance was modeled as described in equation (1') of UAT-WP-5-08.

Two UAT formats are studied: the long ADS-B message with error correction provided by RS(47,33) coding, and the uplink message with error correction provided by 6xRS(85,65) coding. Although these two codes have recently been updated to RS(48,34) and 6xRS(92,72), the older codes were used in the simulations to avoid debugging delays. The difference in performance between the old and new codes would appear to be negligible (particularly since the focus of this paper is on the filter comparison only).

Figures 1 and 2 show the performance of the long ADS-B messages in the heavy and light scenarios, respectively. Figures 3 and 4 show the performance of the uplink messages in the heavy and the light scenarios, respectively. In these graphs, the transmitter power is assumed to be 25 watts. Performance for other transmitter powers can be determined by rescaling the horizontal axes appropriately.

Consideration of the graphs shows that the conclusions to be drawn do not differ between the heavy scenario and light scenario, which suggests that looking at other scenarios is not necessary. The narrow filter generally gives slightly better performance; however, the differences are not great and there are even some parts of the graphs where the wider filter is better.

It is recommended that WG-5 consider whether the marginal advantage of the narrow filter is sufficient to outweigh the better performance of the wide filter in self-interference scenarios.
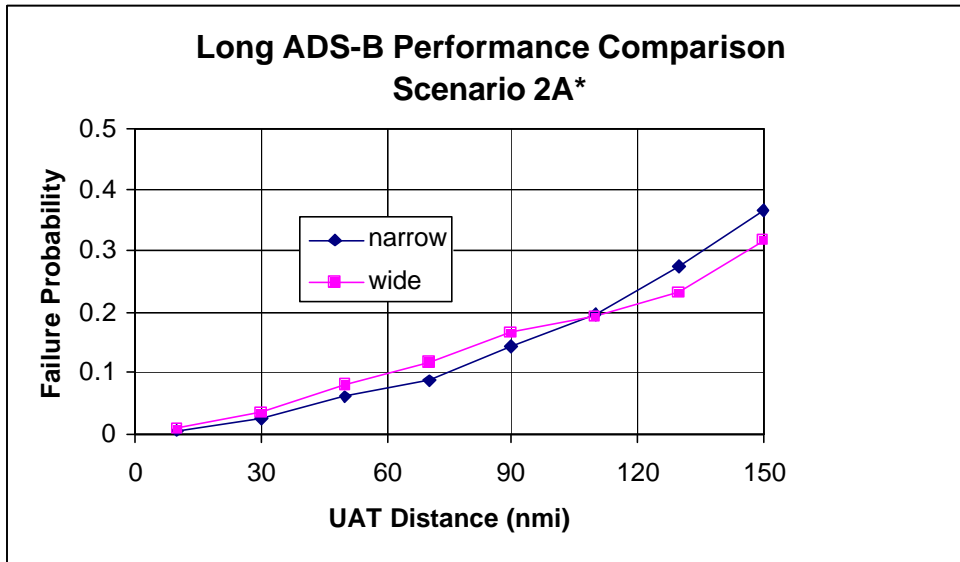
Figure 1. Long ADS-B Message Performance in Heavy JTIDS Interference
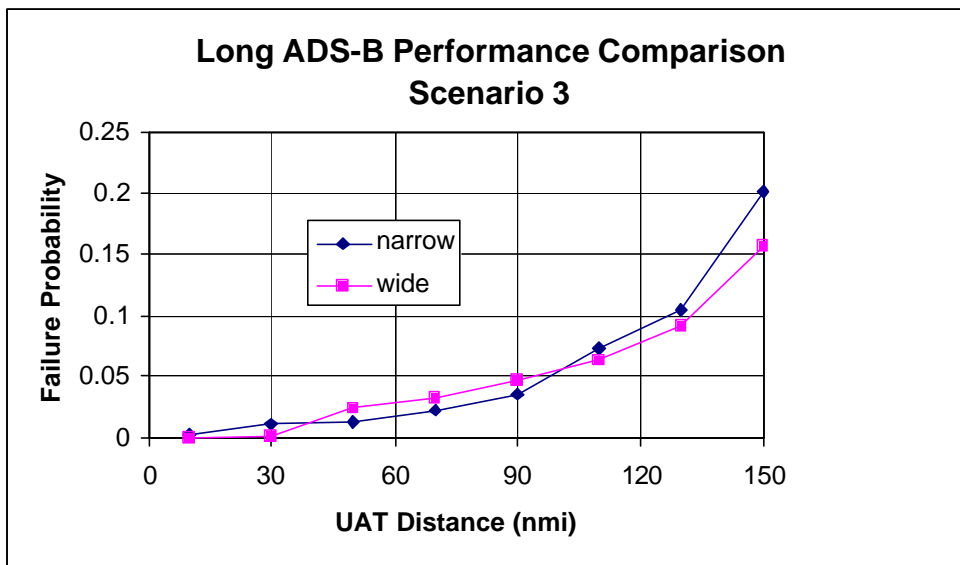UAT Power = 25 Watts



Figure 2. Long ADS-B Message Performance in Light JTIDS Interference
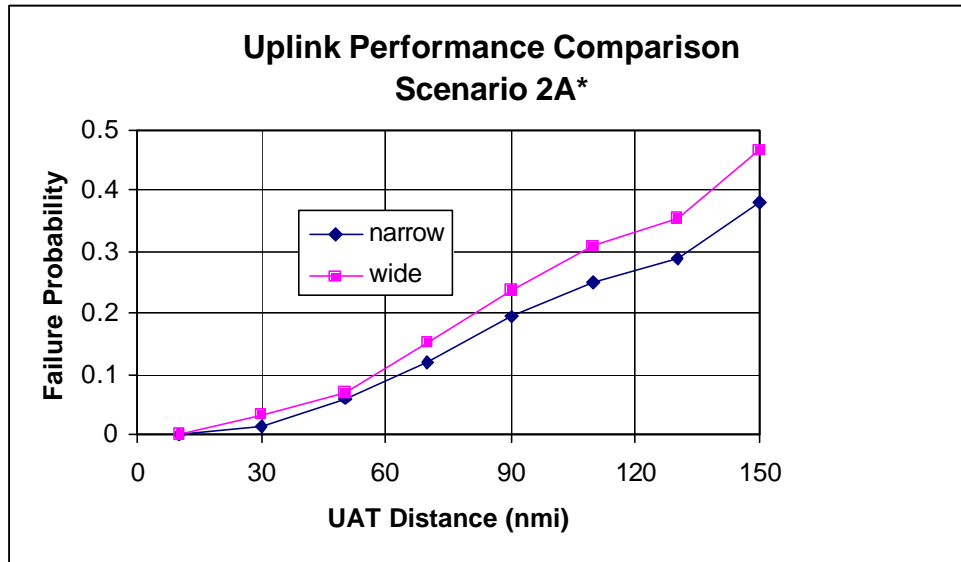UAT Power = 25 Watts

Figure 3. Uplink Message Performance in Heavy JTIDS Interference
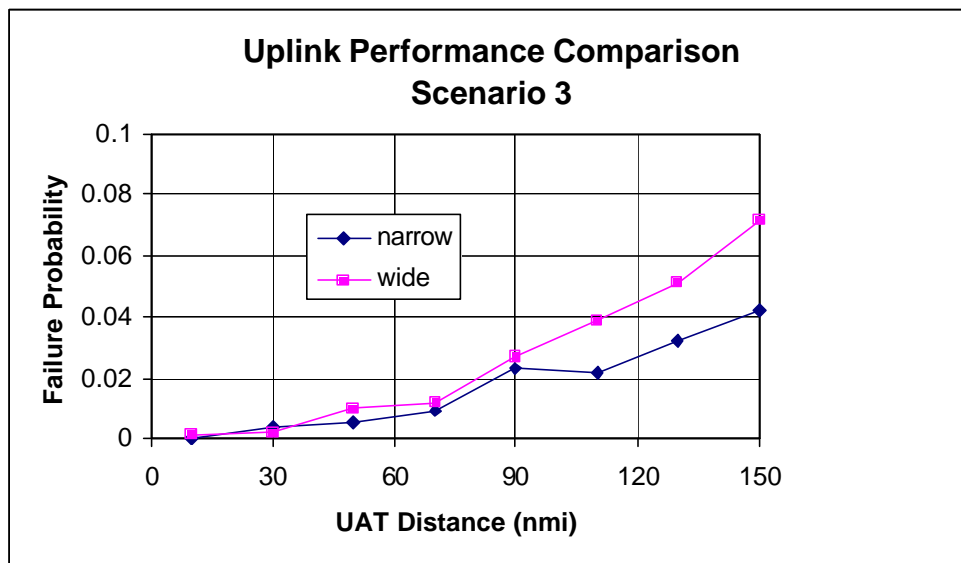UAT Power = 25 Watts



Figure 4. Uplink Message Performance in Light JTIDS Interference
UAT Power = 25 Watts